UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR		ATTORNEY DOCKET NO.
08/941,170	09/30/97	MCFARLAND	E	65304-020

HM12/0624
ERIC M. DOBRUSIN, ESQ.
RADER, FISHMAN & GRAUER, PLLC
1533 N. WOODWARD AVENUE
SUITE 140
BLOOMFIELD HILLS MI 48304

EXAMINER	
RICIGLIANO, J	
ART UNIT	**PAPER NUMBER**
1618	14

DATE MAILED: 06/24/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 08/941,170	Applicant(s) MacFarlan et al
	Examiner Joseph W. Ricigliano Ph. D.	Group Art Unit 1618

☒ Responsive to communication(s) filed on *Mar 22, 1999*.

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1 and 3-61* is/are pending in the application.

Of the above, claim(s) *3, 4, 16-22, 26-38, and 58-61* is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1, 5-15, 23-25, and 39-57* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). *13*

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

KEITH D. MacMILLAN
PRIMARY EXAMINER

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Please Note: The examiner's art unit designation has changed to 1618.

DETAILED ACTION

1. This action is responsive applicants' response and amendment of 3/22/99.

Election/Restriction

2. Applicants are referred to the original restriction set forth in the office action of 8/5/98 paper number 6.

3. IV Claims 58-61 form a distinct invention set forth as group IV, drawn to a product which is a material testing array which can be classified in at least classes 205, 435 and in the 520-570 series in numerous subclasses depending on the composition of the elements forming the array.

4. Inventions IV and I are related as apparatus and product made. The inventions in this relationship are distinct if either or both of the following can be shown: (1) that the apparatus as claimed is not an obvious apparatus for making the product and the apparatus can be used for making a different product or (2) that the product as claimed can be made by another and materially different apparatus (MPEP § 806.05(g)). In this case the products can be made by sputtering or vapor phase deposition apparatus which apply the compounds on to surface bearing electrodes.

5. Inventions IV and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be

made by another and materially different process (MPEP § 806.05(f)). In the instant case the product can be made by a different process such as the vapor phase deposition or sputtering of materials on to a surface bearing electrodes.

6. Invention IV is directed to a testing array and III (directed to a material) patentably distinct products as the array of IV contains different materials than those of invention III. As the materials have different compositions, they have different properties.

7. Because these inventions are distinct for the reasons given above and the search required for Group IV is not required for Groups I-III, restriction for examination purposes as indicated is proper.

8. Newly submitted claims 58-61 directed to an invention that is independent or distinct from the invention originally claimed for the reasons set forth above.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 58-61 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

9. Claims 1-40 were previously pending in the instant application. Claim 2 has been canceled. Claims 3, 4, 16-22 and 26-38 have been withdrawn as being drawn to a non-elected invention. Newly submitted claims 41-61 have been entered. Claims 58-61 are withdrawn from consideration as being drawn to a nonelected invention. Claims 1, 5-15, 23-25, 39-57 are currently being examined on their merits.

10. This application contains claims 3, 4, 16-22 and 26-38 drawn to an invention nonelected with traverse in Paper No.8. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections Withdrawn

11. The rejection of claims 1, 2, 5-15, 23-25 and 39-40 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the deposition of electroplatable materials, does not reasonably provide enablement for one or more source materials. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to utilize the invention commensurate in scope with these claims has been withdrawn in view of applicants' amendment to limit the materials to inorganic compounds and electro-polymerizable polymers.

12. The rejection of claims 1, 2, 5-15, 23-25 and 39-40 recite "a source material" at page 9 of the specification applicants definition encompasses every known material in the universe therefore it is unclear what is or is not a source material has been withdrawn in view of applicants' has been withdrawn in view of the amendment to limit the materials to inorganic compounds and electro-polymerizable polymers.

13. The rejection of claims 39 and 40 for reciting a means for testing associated with said plurality of electrodes has been withdrawn in view of applicants' amendment.

14. In view of applicants amendments the following rejections under 35 USC 102/103 are withdrawn:

Claims 1, 2, 9, 10, 12, 13 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Faulkner [US 4,422,788].

Claims 1, 2, 5, 8-10, 12, 13 and 23-25 are rejected under 35 U.S.C. 102(b) as being anticipated by Fabel et al [US 4,402,000].

Claims 1, 2, 5, 8, 9, 12 and 23-25 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kubelik [US 5,450,103].

Claims 1, 2, 9, 12, 13, and 23-25 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Payne [US 4,318,608].

Claims 1, 2, 9, 12, 13 and 23-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Imamura [US 5,679,234].

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imamura.

NEW GROUNDS OF REJECTION

Claim Objections

15. Claim 23 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 23 has been amended to recite that the arrays have been configured to apply the components to allow for comparison of the specific materials at the predefined regions. It is unclear how this limits the apparatus as any specified arrangement would allow comparison.

Claim Rejections - 35 USC § 112

16. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

17. Claims 1, 2, 5-15, 23-25, 39-42, 44 and 45 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants have introduced a number of changes into the instant claims which do not appear to be supported by the disclosure as originally filed including:

i) The recitation in claim 1 that the materials under go chemical reaction at the predefined regions and that they can be "inorganic" compounds or "electro-polymerizable monomers."

ii) The recitation in claim 44 that the electrodes are embedded in withing in the substrate

iii) The recitation in claim 45 that the electrodes are disposed on a surface of the substrate

Applicants may over come this rejection by indicating where support may be found in the disclosure as originally filed.

18. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

19. Claims 1, 2, 5-15, 23-25 and 39-42 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 39 and 40 recite the plurality of materials are "inorganic compounds or polymers." This is indefinite as it is unclear if applicants intend the claim to be read as inorganic compounds or inorganic polymers, or if applicants intend the claim to be read as polymers (organic or inorganic) and inorganic compounds. Therefore, it is not possible to determine the metes and bounds of the invention as claimed.

Claims 1, 2, 5-15, 23-25, 39-42 and 43-47 recites that the components of at least two of the predefined regions are different. This is vague and indefinite as it is unclear what applicants intend by different. Does this mean the constituents are different or that the same component may be applied but in a different concentration, thickness or amount? Therefore, it is not possible to determine the metes and bounds of the invention as claimed. Applicants may wish to amend the claim to indicate that the said component applied two at least two predefined regions are different. In considering such an amendment, applicants are reminded to indicate where support for such amendments may be found in the disclosure as originally filed.

Claims 1, 2, 5-15, 23-25 and 39-42 recites that at least two of the components of two of the components of at least two of the predefined regions are different. As the apparatus may apply component from one or more source materials, it is unclear how the component will be different when components from only one source material is applied. Therefore, is not possible to determine the metes and bounds of the invention as claimed.

Applicants have amended claims 1, 2, 5-15, 23-25 and 41-42 to recite that the electrical potential causes "the components of the source materials to undergo chemical reaction at the predefined regions and thereby to deposit at the predefined regions" This is vague and indefinite

because it is unclear if all components of the source material must undergo reaction and deposit at the predefined region or if only some components must deposit. For example, as written if a source material was a copper surface solution electroplating copper on to a predefined region would appear to be excluded from the reactions the apparatus is designed for. This contrasts with the original preamble which sets forth that components of the source materials are to be applied not all components as implied by the body of the claim. Moreover, as only one component need be applied, if no components is applied in one region and a components is applied in a different region are the components of the regions different? Therefore, it is not possible to determine the metes and bounds of the invention as claimed.

Claims 43-57 recites that least two members of the array of materials are different. This is vague and indefinite as it is unclear what applicants intend by different. Does this mean the constituents are different or that the same component may be applied but in a different concentration, thickness or amount? Therefore, it is not possible to determine the metes and bounds of the invention as claimed. Applicants may wish to amend the claim to indicate that the composition of the material in predefined regions are different. In considering such an amendment, applicants are reminded to indicate where support for such amendments may be found in the disclosure as originally filed.

20. Claim 9 is indefinite as it is dependent from claim 2 which has been canceled. In order to proceed with more compact prosecution claim 9 has been considered to depend from claim 1 from which canceled claim 2 depended.

21. Claim 46 recites that the substrate provides a substantially continuous potential between predefine regions. This is vague and indefinite as it is unclear if this is intended to mean the potential is the same or if the potential varies substantially across the predefined regions. Therefore, it is not possible to determine the metes and bounds of the invention as claimed.

Claim Rejections - 35 USC § 102/103

22. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

24. Claims 1, 9, 10, 12-15, 23-2541-43, 47, and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Southern WO 93/22480 or under 102(e) as being anticipated by Southern US 5,667,667.

While both references by Southern are cited independently, for the sake of expediency the relevant teachings are listed by line and page of the WO reference.

Independent claims 1 and 43 set forth an apparatus comprised of a source material (electropolymerizable monomers and materials applied). A substrate and potential assembly (of spatially addressable electrodes) such that applying an electrical potential across the substrate causes the components of the source material to undergo a chemical reaction and thereby deposit at the predefined regions.

Southern teaches an apparatus for applying a source material (electropolymerizable monomers and associated reagents for their application) to a substrate which has a potential assembly for applying a spatially varying electrical potential. See for example figure 2a-b. The application of current is used to cause appropriate monomers to undergo reaction where in different predetermined regions have different components deposited, see figures 1, 2d and page 10 line 25-page 11 line 26. The device is useful for the fabrication of devices carrying arrays of complex chemical substances, page 4 lines 24-36.

With respect to the dependent claims: Southern teaches that the substrate is in contact with an ionic solution as required by claim 9 and 13 (fig 2c and 2d), and that the substrate can be glass (example 1 on page 11). As the substrate is immersed in a solution, it must have an enclosure in which the substrate is housed as required by claim 12. As the apparatus of Southern comprises electrodes which are long strips which can alternately be used as anode and cathode, the potential varies from the cathode to the anode continuously across the entire length of the array. As the substrate is glass it is a resistive material as required by claim 15. As the material deposited can be applied as a square array of 256 material in less than 1 cm square (Figure 1), Southern meets the limitation of claims 23-25. As the monomers (nucleotide

precursors) are in solution and the source material undergoes a reaction which leads to the deposition of a monomer at defined location Southern anticipate claims 41 and 42. In that the electrode array of Southern a series of electrodes in which any can be spatially addressed and set to any desired voltage, those electrodes not being used in the electrodepositon are reference electrodes. Last, it is noted that ions of the source materials undergo redox reactions at the predefined regions as required by claim 50.

25. Claims 1, 2, 5-15, 23-25 and 39-42 are rejected under 35 U.S.C. 103(a) as obvious over Southern in view of Hunter et al US 5,641,391

See the teaching of Southern as applied to claims 1, 9, 10, 12-15, 23-2541-43, 47, and 50 under 35 U.S.C. 102(b) as being anticipated by Southern WO 93/22480 or under 102(e) as being anticipated by Souther US 5,667,667 *supra.*

In the rejection above the source materials were taken as the nucleotides/ nucleotide precursors as set forth above. In the alternative embodiment the source materials could be inorganic compounds. In addition to the teachings above it is noted that Southern teaches that the process and apparatus is useful for making small devices and that a wide array of chemical modifications can be envisaged including oxidations, reductions and that numerous devices including solid state devices can be made. The apparatus of Southern is also useful for the fabrication of devices carrying arrays of complex chemical substances, pages Southern does not expressly recite the use of inorganic material to be deposited, pages 1-4.

Hunter et al teach microfabrication of devices by eletro-deposition. Hunter et al teach the ability to deposit a wide range of materials is particularly important because microdevices required numerous components (see col. 1, lines 32-36). Hunter specifically teaches that a large number of inorganic materials can be electro-deposited including metal alloys and semiconductors.

It would have been *prima facia* obvious to one of ordinary skill in the art at the time the invention was made to electro-deposit inorganic materials as evidenced by Hunter et al using an apparatus as taught by Southern because Southern teaches an apparatus which can be used to make arrays by electro deposition and Hunter et al teach that numerous materials including inorganic materials can be electro deposited.

26. Claims 1, 5-13, 23-25, 41, 42 and 50 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hunter et al US 5,641,391.

Hunter et al teaches an apparatus for microfabrication which can apply many components form source materials including inorganic compounds (col 9 lines 53-60 and column 3 lines 19-21) on to a substrate (see figure 1a). The apparatus has an assembly for spatially varying the electrical potential across the substrate (one or more electrodes, item 11 and col 5, lines 23-27). Applying potential to the electrodes causes the deposition of components of the source materials on to the substrate. Hunter et al also teach that one advantage of method of using the apparatus described in microfabrication is the ability to make microstructures having a wide variety of geometries and wide varieties of materials to be constructed with a resolution dependent only on

the ability to localize electrochemical deposition or etching (see col. 5 line 66-col. 6, line 5). This anticipates having different materials applied to different predetermined regions of the substrate. Hunter also teaches electro-deposition out of solution (figure 1a-d).

Therefore, Hunter anticipates the invention of independent claims 1 and 43.

With respect to the dependent claims:

Hunter teaches that a voltage supply or a current source is connected to the electrode and substrate (col. 8 lines 23-28). In that the Hunter teaches using multiple electrodes which can have different potentials applied, Hunter anticipates claim 5, 6, 7 and 8 as the substrate and electrodes are coupled through the power voltage supply or current source (col. 7, lines 50-60 and col. 10, lines 9-13). As Hunter plates form a solution and indicates that materials such as CdSO4 can be used the inventions of claims 9, 12, 13 and 41 are anticipated. In that Hunter set forth that the substrates can be semiconductors or polymers (see claim 10 for example) the inventions of claims 10 and 11 are anticipated. In that Hunter teaches that the apparatus can deliver numerous metals including the 26 listed at col. 9 lines 54-56 the invention of claim 24 is anticipated. In that materials, especially metals can be electro-deposited (redox reaction)using electrodes as small as 5 nm claims 50, 42 and 25 are anticipated. As the substrates utilized by Hunter are conducting substrates.

One might a argue that Hunter does not anticipate the invention as Hunter does not actually prepare a substrate where two of the components in predefined regions are different. However, it would have been prima facia obvious to one of ordinary skill in the art at the time the invention was made to prepare a substrate having at least two of the components deposited at

predetermined positions being different using the apparatus of Hunter et al because Hunter teaches that the apparatus described therein is for microfabrication and can apply many components form source materials including inorganic compounds. One of ordinary skill in the art would have been motivated to do so in the process of microfabricating devices as taught by Hunter et al, as the reference teaches the ability to deposit a wide range of materials is particularly important in fabricating micro devices as they required numerous components (see col. 1, lines 32-36.

27. Claim 1, 5, 8-13, 15 23-25, 43-45, 48 and 50 are rejected under 35 U.S.C. 102(b) as anticipated by Liu et al [US 4,988,412].

Liu et al teach an apparatus and method in which different inorganic materials (metals) are elctrodeposited using an electrolytic bath to deposit on a substrate in different regions. Different components of the source materials, see the abstract, the figures and the summary of the invention. Note that as the apparatus must contain an anode and a cathode at least one other electrode must be present. Therefore, Liu et al anticipates the invention of independent claims 1 and 43.

With respect to the dependent claims:

Liu et al teaches electrodes can be embedded in the substrate or disposed on the surface (Liu et al teach using more than one type of electrode), and as the deposition is electrolytic (electroplating) the electrodes must be coupled to a power source, hence claims 5, 44, 45 and 50 are anticipated. As the areas to be plated correspond the electrodes claim 8 is anticipated. As plating is done electrolytically in a bath from salts in solution claims 9, 12 and 13 are anticipated

As SiO2 can be use as a component of the substrate, claims 10 and 11 are anticipated (col. 12 lines 23-40 for example). As Liu et al teach the materials are applied in patterns claim 23 is anticipated. As the apparatus is capable of delivering a variety of metals or metal alloys in lines approximately 6 microns thick (col. 6, lines 9-13) hence Liu et al anticipates claims 24 and 25. As the regions which can be plated may be wells (see figure 4c-d, and col 8 lines 20-33) claim 48 is anticipated.

28. Claims 39 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Borrelli et al 4,070,565.

Borrelli teaches an apparatus for measuring individual logic elements. The logic elements are circuits formed from inorganic material arrange into a plurality of predefined regions on the array and there are a plurality of electrodes (conductors used to establish contact, i.e., wires, pins or conductors on a printed circuit board) which correspond to the circuits (predefined regions) present in the array. As the apparatus measures electrical properties including impedance it anticipates claims 39 and 40.

Conclusion

29. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph W. Ricigliano Ph. D. whose telephone number is (703) 308-9346. The examiner can be reached on Monday through Thursday from 7:00 A.M. to 5:30 P.M.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703) 308-0196

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald E. Adams Ph. D., can be reached at (703) 308-0570.

Joseph W. Ricigliano Ph. D.

KEITH D. MacMILLAN
PRIMARY EXAMINER